Instructional Design Guidelines for Authentic Activity in Online Learning Units

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Abstract: The current trend to use the World Wide Web as a vehicle for the delivery of distance education units has required educators to adopt innovative approaches to the design of learning materials for this medium. However, the temptation to place large tracts of text online is deeply entrenched. This paper describes a project where guidelines for the design of authentic activities have been derived from a broad literature base. The guidelines have been used in the development of Masters subjects, where authors are encouraged to use learning activities as the central focus of study—the activity does not supplement the unit, it *is* the unit. The emphasis is placed on the design of activities, integrated assessment of the activities, identification of resources and establishment of collaborative tools. Examples of activities, together with the instructional design guidelines, are provided, and the use of theory and research to inform the instructional design process is discussed.

Authentic activities

Activities, investigations and problems are at the heart of student involvement in meaningful learning contexts. Teachers provide such activities to enable students to interact with the learning environment, and to learn, apply and practice newly acquired skills. Activities are defined by Brophy and Alleman (1991) as: 'Anything students are expected to do, beyond getting input through reading or listening, in order to learn, practice, apply, evaluate, or in any other way respond to curricular content' (p. 9).

This paper describes the development of a university-based online project where activities are used, not only as opportunities for students to learn, practice, apply and evaluate, but also as central organising devices for the design of entire online units of study. Clayden, Desforges, Mills and Rawson (1994) point out that the kind of activities frequently used in education simply lead to an enculturation into the practices of classrooms rather than the real-world transfer teachers expect. They note that students' efforts to make sense of classroom experiences generally lead them to focus on working practices rather than abstract ideas. 'What they learn … is how to do work, how to be neat, how to finish on time ... and how to tidy away' (p. 164). While these comments are most appropriate for school (and to some extent university) classrooms, the same conclusions may be drawn for the design of online learning environments. Students frequently learn to invoke 'sub-optimal' schemes to enable them to proceed, rather than deal with the content in a way that promotes true understanding. Many of these online programs are so 'well designed', they fail to account for the nature of real-world problem solving, where the solution is rarely neat and the salient facts are rarely the only ones at students' disposal. In contrast, a number of authors suggest that authentic activities should be ill-defined—students *find* as well as *solve* the problems. Learners need to have the opportunity to: explore a situation with

all the complexity and uncertainty of the real world, have a role in determining the task and how it might be broken up into smaller tasks, select relevant information, and find solutions that suit their needs.

The Cognition and Technology Group at Vanderbilt (1990b) stress the importance of complexity and the necessity to provide an environment capable of sustained examination. They describe authentic tasks as 'generative' because the completion of the task requires the students to generate other problems to be solved. They draw a distinction between these authentic tasks and simple word problems that already define the problem, such as: 'If you travel 150 kilometres at 90 kph, how long will the journey take?' By comparison, Reeves and Laffey (1999) describe a complex learning environment where, for an entire semester unit, the students' task is to establish a research station on Mars, including designing an energy plant to sustain life once a station is established. Similarly, Pennell, Durham, Orzog and Spark (1997) describe a web-based environment where students learn business communication skills by accepting temporary employment in a virtual recording company. They are given a complex task to complete, and in order to do it, they make appointments and keep a diary, 'interview' the director and other employees, and write letters, memos and reports.

Several authors have attempted to delineate characteristics of authentic activities. For example, Jonassen (1991) defines authentic activities as tasks: that have real-world relevance and utility, that integrate those tasks across the curriculum, that provide appropriate levels of complexity and that allow students to select appropriate levels of difficulty or involvement (p. 29). Similarly, Bransford, Vye, Kinzer and Risko (1990) Young (1993) Lebow and Wager (1994) and Savery and Duffy (1996) among others have nominated criteria of authentic activities.

Recommended design features of authentic activities

It is possible to use these findings of the research and writing on authentic activities to produce guidelines for the design of learning environments. Accordingly, authentic activities:

- have real-world relevance (e.g., Brown, Collins, & Duguid, 1989a; Cognition and Technology Group at Vanderbilt [CTGV], 1990a; Jonassen, 1991; Resnick, 1987; Oliver & Omari, 1999)
- are ill-defined (e.g., Brown et al., 1989a; CTGV, 1990a; Young, 1993)
- comprise a single complex task to be investigated by students over a sustained period of time (e.g., Bransford, Vye et al., 1990; CTGV, 1990b; Jonassen, 1991; Savery & Duffy, 1996)
- require students to define the tasks and sub-tasks required to complete the activity (e.g., Bransford, Vye et al., 1990; CTGV, 1990b; Collins, Brown, & Newman, 1989; Young, 1993)
- provide the opportunity to examine the task from different perspectives, (e.g., CTGV, 1990a; Young, 1993; Spiro, Feltovich, Jacobson, & Coulson, 1991; Lebow & Wager, 1994; Savery & Duffy, 1996)
- enable students to detect relevant from irrelevant information, (e.g., CTGV, 1990; Savery & Duffy, 1996)
- provide the opportunity to collaborate (e.g., Young, 1993; Lebow & Wager, 1994)
- can be integrated across subject areas (e.g., Bransford, Sherwood, Hasselbring, Kinzer, & Williams, 1990; Bransford, Vye et al., 1990; Jonassen, 1991).
- are seamlessly integrated with the assessment (e.g., Reeves & Okey, 1996; Herrington & Herrington, 1998).

These principals have been incorporated into the design of activities within online units currently being designed for a suite of Masters level courses.

The Masters Online project

Fifteen professionally oriented Masters courses are presently being developed, in areas such as health, teaching, business, finance, computing and information science. Students in these courses are mostly experienced in the workplace and authentic learning activities are likely to be highly valued by these students. Many of the students live geographically distant from the university, whilst others have such busy lifestyles that on-campus study is impractical. The university has an established tradition of providing external courses for these students. The use of computer technologies to offer enhanced learning environments to external students is a natural next

step. However, it is a significant challenge to provide the required staff development to support such effective change.

In total, the 15 Masters courses offer over 250 subjects or units and involve over 150 academic staff, some of whom have limited experience of working in the online environment. The project has an initial development phase of three years. During the first three years, all units will be adapted for use online, but at differential levels:

1. New units receive the highest level of attention. Lecturers are funded through time release or additional payments to design the new unit. They are supported by an instructional designer and a multimedia development team. These units are designed to use authentic activities as a central focus of the unit. Authors are supported through: information workshops; demonstration, development, discussion and evaluation workshops; group and one-to-one consultations; and an information and example(s) web site.
2. Major revision units (existing distance units in print mode) where the focus is on developing sections of the unit to include authentic activities, and also encouraging students (and staff) to use the research and communication capabilities of the Internet.
3. Minor revisions (existing distance units in print mode) receive minimal content change but provide the staff and students with enhanced communications facilities (bulletin boards, chat rooms, Email, etc.).

Designing authentic online activities

As Salomon, Perkins and Globerson (1991) have pointed out: 'No important impact can be expected when the same old activity is carried out with a technology that makes it a bit faster or easier; the activity itself has to change, and such a change cannot take place in a cultural vacuum' (p. 8). The Masters Online project has a cultural history in the domain of the traditional printed distance education unit. The temptation for many of these authors is to produce blocks of text, similar to chapters of an external unit, and to design a variety of activities to accompany the text, with separate assignments. Encouraging the writers of new units not to put copious 'content' on the web generally requires a huge cultural shift, and a substantial rethinking of what they want students to achieve and how they could enable that learning to occur.

In designing the new units, a complex and sustained activity (with strong teacher support and peer collaboration) is the focus of the entire unit. Students use a purposeful activity to organise their study, to give meaning to their acquisition of information and to provide a framework for the creation of a realistic product. There is no attempt to divide the course into discrete fragments of easily digested information. In this sense, the activity does not supplement the unit—it *is* the unit.

The notion of the activities effectively being the unit is one that is quite foreign, and one that requires a major change in direction for these teachers. The first suggestion from an instructional design point of view has been to encourage the writers not to begin with the traditional scope and sequence, followed by the division of the content into chapters or modules. In the first instance, we ask the writers to plan the activities and to consider that their units might comprise one or two of these sustained and lengthy activities. In order to assist the design process, and to enhance the likelihood that the importance of the activity as a central organising device in the unit is prominent, the following design matrix (Table 1) is given to each writer, with its four main planning areas, together with space for them to jot down their initial ideas. These are then 'brainstormed' and refined in consultation with the instructional designer and the project team.

The design of the activities, and supporting resources and collaborative tools, in many cases require the authors to create scenarios which call for the students to adopt a role or persona. While the option of creating real problems, as recommended by Savery and Duffy (1996) is always preferable, simulated situations are also prepared and are considered an acceptable vehicle for authentic student learning (McLellan, 1994). Table 2 provides an example of a plan for a simulated activity together with its assessment, resources and communication strategies. The activities being designed for the units vary enormously (across 15 courses). Further examples of the kinds of activities being produced include:

- In a computer graphics unit, students produce a piece of software for a particular target group, together with documentation and users' manual. Each assignment represents a stage in the completion of the final product.
- In an environmental management unit, students evaluate and prepare a report on whether a proposed housing estate development will pose a risk to nearby ecosystems.
- In an educational theory unit, students write journal articles in groups and submit their articles to the editorial board of a journal (effectively the other student groups for peer review).

Table 1: Web-based learning activities: Instructional design guidelines

Process	Guidelines	Advice	Examples
1. Designing the activities	Design activities which: • have real-world relevance • are ill-defined • comprise a single complex task to be in-vestigated by students over a sustained period • provide opportunity to define tasks & subtasks	• Reflect the kind of problem students would face in real-life • Choose a problem which enables students to apply the knowledge you want them to learn in your unit • Let the task be the central organising device for the students' learning—don't provide explicit directions and sub-tasks	• Case studies and role play • Decision-making • Dilemmas • Presentations to stakeholders • Public defence of position • Reports and proposals
2. Designing the assessment	Design activities which: • provide the opportunity to collaborate • are seamlessly integrated with the assessment	• Try to integrate the task and assessment. • Set group tasks, and arrange students in collaborative groups where possible • Use whole student group to evaluate each other's work.	• Group tasks • Peer evaluation • Authentic assessment
3, Identifying, locating and/or producing resources	Design activities which: • provide the opportunity to examine the task from a number of different perspect-ives, and to be able to detect relevant from irrelevant information • can be integrated across subject areas	• Create your own resources where necessary, as appropriate to the task • Link to outside sources to provide different perspectives and access to expert thinking • Textbooks, other books and library journals may be necessary because you can find no online equivalent	• Video, audio • Online documents • FAQs etc • Websites • Online journals and databases • Textbooks • Books, journals
4. Selecting collaboration coaching and communi-cation tools	• Design activities which: • provide the opportunity for students to examine the task from a number of different perspectives, and to be able to detect relevant from irrelevant information • provide the opportunity to collaborate	• Encourage collaboration to enable students to support each other's learning • Participate in online discuss-ions so that your voice can be heard through this channel • Encourage students to participate in established list-serves to enable them to be part of worldwide discussions • Use current and emerging technologies to communicate with your distant students	• Email • Discussion boards • Chat sessions, • Online tutorials • Listserves

Lebow and Wager (1994) contend that 'Human learning is essentially a matter of self-regulation' (p. 239). However, this does not mean that students can be given complex and authentic tasks with no support or coaching to guide their learning. Wade (1994) points out that the promotion of learner autonomy means increased responsibility for the student which, if it is to succeed, requires 'a strong framework of support and guidance for the student from the outset' (p. 13). The support to be provided by the tutor of the online unit is

also planned concurrently with the design of the learning activities, together with opportunities for students to collaborate with each other in their learning. It is hoped that development through group activity and dialogue will be more enjoyable, more meaningful and more effective.

Table 2: Example of plan for authentic online activity

Stage of development	Example activity: The ethics of research
1. Designing the activities	"For this activity, you are required to assess the ethical conduct of a proposed piece of research. You are to imagine that you are on the Committee for Ethical Conduct of Research with Human Subjects in your University. Members decide on whether research meets ethical standards, but the whole group never meet in person. You decide each case after an email discussion. (You will be on this committee and the other members are students from your group also studying this unit.) The committee receives an outline of a research proposal from a mature student, who is also a teacher in a primary or elementary school. The student will use her Year 6 class as subjects for the proposed research. The students' research proposal is given below: **Title of research**: The influence of stated teacher belief on student assignment writing **Subjects**: Entire group of Year 6 students in Social Science class **Research overview**: The researcher will adopt the position of participant-as-observer in order to conduct the research.. In order to test the effect of stated teacher belief (as opposed to a genuinely-felt belief) on the students' assignments, the researcher will conduct a short survey of students beliefs on the environment at the beginning of the school year. In the second term or semester, the teacher will state a strongly pro-logging position with regard to the logging of forests, prior to the commencement of a new topic area in social science class. The topic will include discussion of environmental issues relating to deforestation and its impact on ecosystems. The assignment given to the class will require an evaluation of the pros and cons of logging, together with an overall assessment of whether or not logging of old growth forests should be permitted. The influence of the teacher's stated belief will be tested against the survey results obtained earlier in the year. After reading the brief research proposal, you need to respond to the members of the group with a summary of the ethical issues involved and the conditions under which the research could be supported. Your task is to frame a considered response to the student."
2. Designing the assessment	"Because the Ethics Committee would otherwise be snowed under with responses, a word limit of 1000 words has been placed on all committee members for each response. "Send your evaluation to the Unit Online Discussion and participate in the discussion to decide as a group how the Ethics Committee should respond to the student. You will be assessed on your initial response and your final group response to the student."
3. Identifying, locating and/or producing resources	**Resources created, e.g**. • Create email message for members of the committee, and student's research proposal **Links to outside sources, e.g**. • Nuremberg and after:http://www.csu.edu.au/faculty/arts/humss/bioethic/resethic.htm • The Ethics Resource Center: http://www.ethics.org/ **Books and journals: e.g**. • American Psychological Association. (1993). Ethical principles in the conduct of research into human participants. *American Psychologist*, 57(1), 33-51. .
4. Selecting collaboration coaching and communi-cation tools	**Communication tools: e.g.** • Online threaded discussions board • Email **Established listserves: e.g.** • Ethics Update Discussion Forum: http://ethics.acusd.edu/kant.html

By the end of the initial three year phase, all units in the Masters courses will be available in an online mode and a significant number will use authentic activities: they will act as models for the future. Teachers will have developed the technical skills necessary for online teaching in a real but supported context, and engaged in a range of problem-based, reflective activities which seriously probe the nature of teaching and learning.

Conclusion

The adoption of online learning environments has frequently been an ad hoc affair in universities, often led by one or two computer enthusiasts or early adopters (Bates, 1999). While the individual approach has the advantage of commitment and speed towards implementation, there can be a tendency for early users to simply replicate existing teaching and learning practices in the online environment. Many staff development programs provide technical assistance to academic staff wishing to apply new communication and learning technologies to their teaching. Technical advice alone, however, seldom challenges teaching staff to reflect deeply on the nature of learning and to reconsider the learning goals and values which underpin their choice of teaching methods. The project described here was developed specifically to encourage academic staff to move beyond replication of existing ideas and to restructure their units according to the recent theory and principles of authentic learning.

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